

# Sacrospinous Ligament Fixation for Neovaginal Prolapse Prevention in Male-to-Female Surgery

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<b>OBJECTIVES</b>	To report our experiences of vaginal sacrospinous ligament fixation after vaginoplasty in male transsexual patients with the aim of preventing its postoperative prolapse.
<b>METHODS</b>	From August 1997 through November 2005, a total of 62 male transsexual patients (mean age 26 years, range 18 to 58) underwent sacrospinous ligament fixation for neovaginal prolapse during male-to-female sex reassignment surgery. The neovagina was created from a penile skin tube flap combined with a urethral flap. A deep and wide perineal cavity between the urethra, bladder, and rectum was created by dissection of the tendineous center and rectourethral muscle. The right pararectal space was opened by penetrating the right pararectal fascia (rectal pillar) and right ischial spine was palpated. Using the ischial spine as a prominent landmark, the sacrospinous ligament was palpated. Long-handled Deschamps ligature was used to pierce the ligament medially to the ischial spine. Vaginopexy to the sacrospinous ligament was performed, and the neovagina was placed deep in the perineal cavity.
<b>RESULTS</b>	The median follow-up was 32 months (range 7 to 102). Sacrospinous ligament fixation was successfully performed in all patients. The mean vaginal length was 10.7 cm (range 9.5 to 16). Of the 62 patients, 42 (76%) were able to have normal sexual intercourse. The appearance of the neovagina was aesthetically acceptable in 52 patients. In 3 cases, a minor bulge of the anterior vaginal wall was easily resolved by simple excision.
<b>CONCLUSIONS</b>	Vaginal sacrospinous fixation is feasible in male transsexuals for neovaginal prolapse prevention. However, extensive experience with male pelvic surgery is required to avoid possible complications. UROLOGY 70: 767–771, 2007. © 2007 Elsevier Inc.

Vaginal prolapse is one of the complications after vaginoplasty in male-to-female sex reassignment surgery. Prolapse of the neovagina, especially its urethral part, results in a bad aesthetic appearance, as well as possible difficulties in satisfactory sexual intercourse. We reported an earlier contribution to these operative techniques in male-to-female surgery and have continued to improve this technique with the aim of achieving better results.<sup>1,2</sup> With the advent of our special interest in transsexual surgery, we have learned more about the anatomy of the pelvis and its supports and attachments. The sacrospinous ligament is the strongest supporting ligament in the pelvis. Transvaginal sacrospinous ligament fixation was originally introduced as a means of correcting vaginal vault, as well as uterovaginal prolapse concomitantly with vaginal hysterectomy.<sup>3–7</sup>

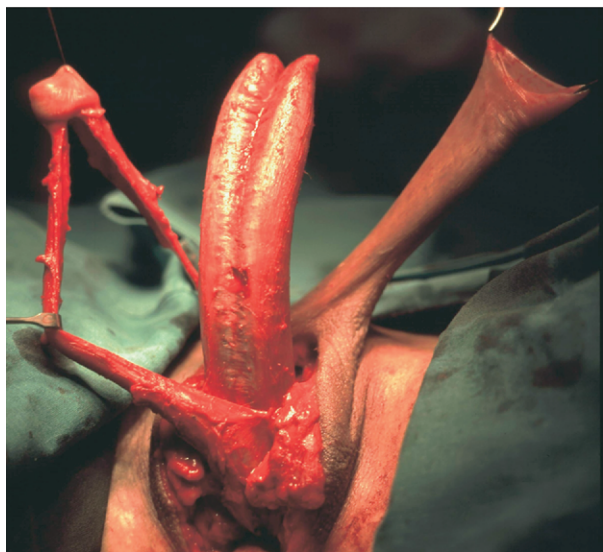
We report our experiences of vaginal sacrospinous ligament fixation after vaginoplasty in male transsexual patients.

## MATERIAL AND METHODS

From August 1997 through November 2005, a total of 62 male transsexual patients (mean age 26 years, range 18 to 58) underwent sacrospinous ligament fixation for neovaginal prolapse during male-to-female sex reassignment surgery. A standard technique with a vascularized inverted penile skin and urethral flap were used in 55 patients. In the remaining 7 patients with short inverted penile skin, the neovagina was created using a vascularized urethral flap and an additional scrotal skin flap.

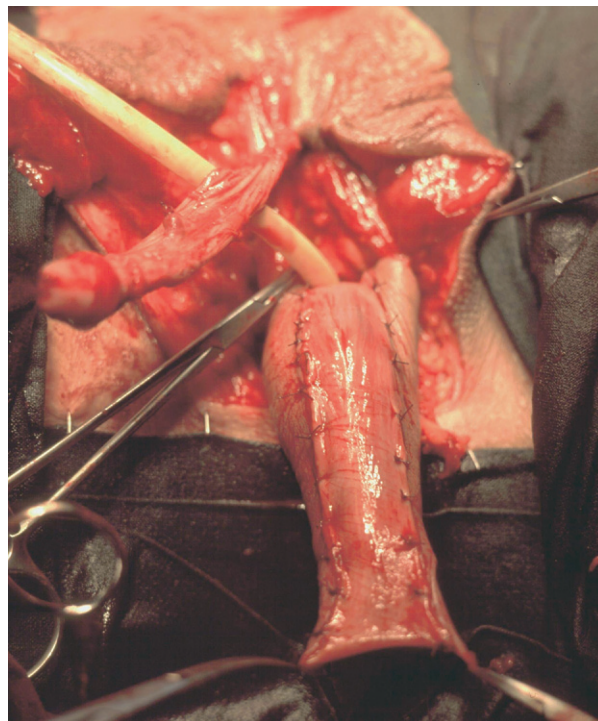
Several subprocedures are required to form the new vagina. After the usual bilateral orchiectomy, the penis is dissected into its anatomic components: the corpora cavernosa, glans cap with the urethra and neurovascular bundle, and vascularized penile skin (Fig. 1). The corpora cavernosa are removed up to their attachments to the pubic bones. The dorsal part of the glans is reduced by excising the central ventral tissue, leaving the sides of the glans intact. The sides are de-epithelialized and sutured

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**Figure 1.** Penile disassembly. Corpora cavernosa removed up to their attachments to pubic bones. Glans cap divided into two parts (ie, ventral with urethra for creation of bottom of neovagina and dorsal with neurovascular bundle for creation of new clitoris).

to obtain a conical shape for the neoclitoris. The anterior urethra is spatulated, including the bulbar part, and used to create the mucosal part of the neovagina. Any bleeding in the bulbar urethra is controlled with hemostatic sutures. A female-type urethra is then formed, and the neoclitoris is fixed above the new urethral meatus. In reconstructing the new vagina, the skin of the penile body and prepuce (if present) are fashioned into a vascularized island tube flap. On the dorsal side of the skin tube flap, only the skin is incised, and the vascularized subcutaneous tissue remains intact. The urethral flap, which is transposed through the pedicle hole, is embedded into the skin tube and sutured. Its bottom is closed and the tube, consisting of the skin and urethral flap, is inverted, thus forming the new vagina (Fig. 2). If the penile skin is insufficient (because of a small and/or circumcised penis), the short skin flap and long urethral flap will be used together with a vascularized scrotal skin flap to create the neovagina. Space for the new vagina is created in the perineum. Two tunnels are made on both sides of the tendineus center; this and the rectourethral muscle are cut, allowing access to the deep and wide perineal cavity between the urethra, bladder, and rectum (in most cases with blunt dissection). Particular care should be taken to avoid injuring the rectum. The right pararectal space is opened by penetrating the right pararectal fascia (rectal pillar) and the right ischial spine is palpated. Using the ischial spine as a prominent landmark, the sacrospinous ligament is palpated as it passes from the ischial spine to the lower part of the sacrum. After exposing the ligament, a long-handled Deschamps ligature carrier preloaded with 2-0 delayed absorbable suture is used to pierce the ligament medially to the ischial spine (Fig. 3). Care must be taken not to place the suture close to the ischial spine to prevent injury of the pudendal nerve and internal pudendal vessels. Also, the suture must not be placed behind the ligament to prevent injury to the pudendal artery whose course is variable and can be at any distance from the ischial spine. Both ends of the suture are brought out; one is passed through the skin part and the other is passed through the urethral part of the distal



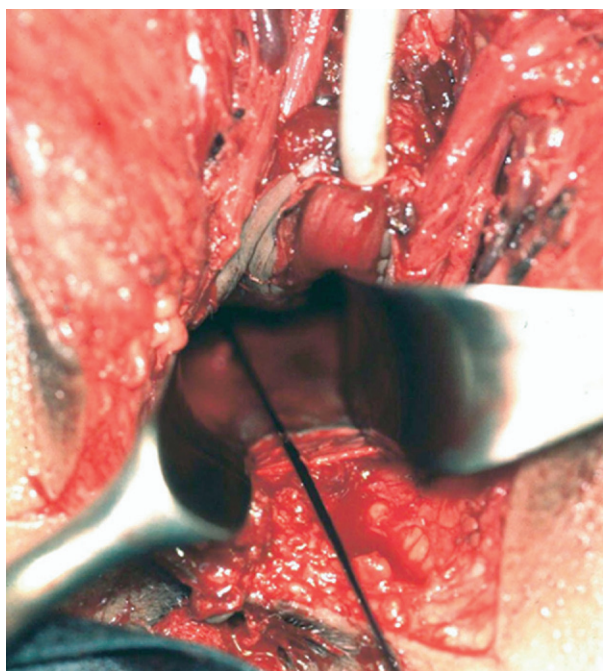
**Figure 2.** Long tube consisting of vascularized penile skin and vascularized urethral flap is created and will be inverted to form neovagina.



**Figure 3.** Superior aspect of model of pelvis. Placement of suture to sacrospinous ligament with Deschamps ligature carrier.

third of the neovagina, and the fixation stitches are firmly tied (Fig. 4). The right sacrospinous ligament was used in all cases; no bilateral fixation was performed. It is technically easier to use the right ligament for the right-handed surgeon. A delayed absorbable polyglycolic acid suture (Vicryl, Johnson & Johnson) was used in the first 19 patients and a delayed polyglyconate monofilament absorbable suture (PDS, Ethicon) in the next 43 patients. Monofilament absorbable suture is technically easier to pass through the ligament using the Deschamps ligature carrier. Vaginopexy to the sacrospinous ligament is performed, and the neovagina is placed deep in the perineal cavity. This provides good placement of the neovagina, and prolapse is





**Figure 4.** New vagina is deeply placed in perineal cavity and fixed to sacrospinous ligament. Urethra of female type is visible.



**Figure 5.** Aspect at end of surgery; labia minora covers neoclitoris (hooded clitoris).

avoided. Vulvoplasty, which involves the creation of the labia minora and majora, is finished using the remaining part of the base of the penile skin and scrotal skin (Fig. 5). A perivaginal Jackson-Pratt drain is left for 3 days; the urethral catheter and

vaginal packing are removed 7 days postoperatively. The vaginal stent is used during the night for 6 weeks.

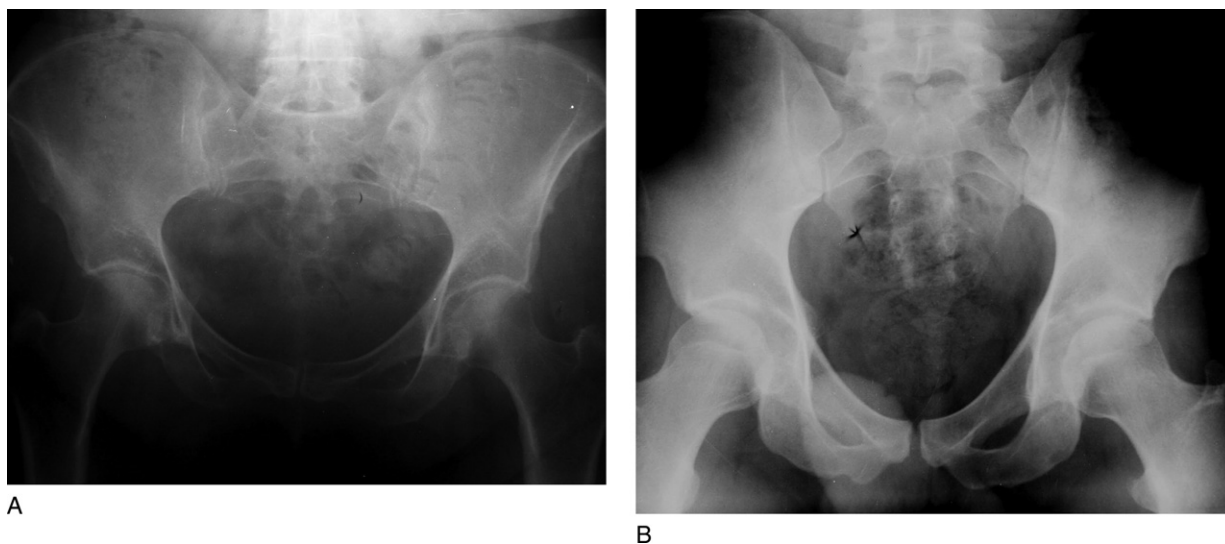
## RESULTS

The median length of follow-up was 32 months (range 7 to 102). Sacrospinous ligament fixation was successfully performed in all 62 patients without postoperative neovaginal prolapse. Seven patients were lost to follow-up. The most important features of the new vagina are the depth and width; the mean depth was 10.7 cm (range 9.5 to 16), but a precise measurement of the vaginal width is difficult. It was estimated that of the patients using the vaginal stent, 6 had vaginas that were small, 41 were medium, and 8 were large. Six months after surgery, 42 patients (76%) reported normal sexual intercourse; however, despite having an adequate vagina, some patients refrained from intercourse. The appearance of the neovagina was aesthetically acceptable in 52 patients according to their satisfaction. Bulging of the anterior vaginal wall (ie, urethral prolapse) caused occasional bleeding during sexual intercourse in 3 patients. It was easily resolved by simple excision. Two patients had transient mild right buttock pain that subsided after 2 months. No patients had any instances of chronic pain or other neurologic deficiency.

## COMMENT

Surgery for male transsexuals still presents a major challenge in creating a new vagina.<sup>8-10</sup> Our previous operative technique has been improved by several refinements in vaginoplasty using penile skin tube combined with a urethral flap.<sup>1,2</sup> One of the main difficulties to achieving good functional and aesthetic results remains neovaginal fixation. Good fixation is important to prevent postoperative prolapse, which could result in a bad cosmetic appearance, as well as in some degree of vaginal shortening. Prolapse of the urethral part of the vagina, which we observed when using the Stamey fixation procedure, was a great challenge in the search for a better solution. With the advent of our special interest in transsexual surgery, we have learned more about the anatomy of the pelvis and its supports and attachments. The sacrospinous ligament is one of the strongest supporting ligaments in the pelvis. Also, repair of vaginal vault prolapse and uterovaginal prolapse using sacrospinous ligament fixation is a well-known technique with high efficiency in long-term reported studies.<sup>3-6</sup> Because of the good results in the treatment of vaginal prolapse in women, we started to use the same principle in male transsexuals.

In contrast to transvaginal sacrospinous ligament fixation for treating vaginal prolapse in women,<sup>3-5,7</sup> significant difficulties exist to using this procedure in male transsexuals. A great knowledge of the pelvic, both female and male, anatomy is required for sacrospinous ligament fixation. The female pelvis is distinguished from that of the male by its bones being more delicate and its



**Figure 6.** Radiograph of (A) female and (B) male pelvis. Cavity of female pelvis is shallower and wider. Ischial spine in male pelvis is closer to pelvic axis and sacrospinous ligaments are shorter and thicker.

depth less. The cavity of the female pelvis is shallower and wider. The schiatic notches are also wider and shallower, and the spines of the ischia project less inward. The sacrospinous ligament is placed between the schiatic notches and the sacrum. Owing to these differences, the sciatic notches in males are closer to the pelvic axis and sacrospinous ligaments are shorter and thicker. Their anatomic position in males allows fixation of the neovagina close to the sacrum, which in return results in matching of the neovaginal axis and the axis of the pelvis (Fig. 6).

We had no intraoperative complications related to this type of vaginal fixation. The surgeon must be very careful about the anatomic relationship because damage to the pudendal vessels and nerve, sciatic nerve, ureter, and rectum is possible. Exposure of the sacrospinous ligament/coccygeus muscle complex requires adequate dissection of the pararectal space, which will also aid in avoiding injury to the rectum. The possibility of injury to the pudendal vessels and nerve can be avoided by careful placement of suture through the sacrospinous ligament and two fingerbreadths medial to its insertion on the ischial spine.

We performed sacrospinous fixation on one side (the right side), and the postoperative results demonstrated no disturbance in the vaginal axis or any other consequences in male transsexuals, because the distance between the sacrospinous ligaments is shorter than in females. Adequate sexual intercourse was possible for most patients (76%). Another major advantage compared with the previously used Stamey fixation procedure was prevention of marked prolapse and an exaggerated posterior vaginal fourchette. Engorgement of the bulbar urethra during sexual arousal is moderate and does not present a barrier to intercourse. Complications related to sacrospinous fixation were infrequent and included mild right

buttock pain in 2 patients that was short lived (less than 2 months in duration) and resolved without treatment. In 3 cases, a minor bulge of the anterior vaginal wall (urethral part of neovagina) occurred that was easily resolved by simple excision. Although more recent devices are available for sacrospinous suture placement such as the AutoSuture Endostitch, the Capio needle driver, and the Raz Anchoring System, we preferred this older method because we were more experienced with this technique.<sup>11,12</sup> One lack of our study could have been the impossibility of comparing our results with those of other studies because no data are available concerning this procedure in transsexual patients. However, our results suggest that this procedure will be useful in this group of patients because of the low morbidity and postoperative complication rates.

## CONCLUSIONS

The results of our study have demonstrated that vaginal sacrospinous fixation is feasible in male transsexuals for neovaginal prolapse prevention. However, extensive experience with male pelvic surgery is required. If the anatomic relationships of the nearby structures are kept in mind, sacrospinous ligament suspension can be a safe and relatively simple procedure.

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